

513927

1. A capacitive position sensor configured for interconnection to a utilization
2 device, comprising:
 a stationary signal-detecting capacitor plate;
4 a stationary signal-transmitting capacitor plate parallel to, and spaced apart from,
the signal-detecting capacitor plate, the transmitting capacitor plate being divided into a
6 plurality of electrically separated segments;
 a dielectric element disposed between the signal detecting and signal-transmitting
8 capacitor plates;
 an elongate member coupled to the dielectric element, the member being
10 operative to move the element in a plane substantially parallel to the stationary plates as a
function of user position;
12 circuitry in electrical communication with the stationary plates, the circuitry being
operative to (a) measure the capacitance between each segment of the signal-transmitting
14 plate and the signal-detecting plate, and (b) determine user position as a function of the
measured capacitance; and
16 an output for communicating the user position to the utilization device.

2. The position sensor according to claim 1, wherein the utilization device is
2 a computer.

3. The position sensor according to claim 1, wherein the elongate member is
2 a user-graspable joystick.

4. The position sensor according to claim 3, wherein movement of the joystick causes the dielectric element to translate within the plane without rotation.

5. The position sensor according to claim 1, wherein movement of the elongate member causes the dielectric element to rotate within the plane without translation.

6. The position sensor according to claim 1, wherein the segments of the signal-transmitting plate are arcuate.

7. The position sensor according to claim 1, wherein the dielectric element is a circular disc.

8. The position sensor according to claim 1, further comprising:
a pair of assemblies, each including a stationary signal-detecting capacitor plate,
a stationary segmented signal-transmitting capacitor plate, a dielectric element
disposed between the plates, and an elongate member rotationally coupled to the
dielectric element; and
wherein the elongate members are supported at right angles to one another to
measure the movement of a user in x and y dimensions.

9. The position sensor according to claim 8, wherein the assemblies form
2 part of a computer mouse including a rotational ball physically couple to the elongate
members.

10. A method of sensing position, comprising the steps of:
2 providing a position according to claim 1, placing the signal-detecting plate at a
known electrical potential, then:
4 a) placing one of the signal-transmitting plates at a first electrical potential;
6 b) changing the potential on the signal-transmitting plate to second known
potential;
8 c) measuring and storing the capacitance between the signal-transmitting plate
and the signal-detecting plate;
10 d) repeating steps a) through c) for each segment of the signal-transmitting plate;
and
12 e) determining the position of the dielectric element and elongate member as a
function of the stored capacitance measurements.

11. A capacitive-based joystick configured for interconnection to a utilization
2 device, comprising:
a housing having a top surface;
4 a stationary signal-detecting capacitor plate disposed within the housing;

6 a stationary signal-transmitting capacitor plate disposed within the housing
parallel to, and spaced apart from, the signal-detecting capacitor plate, the transmitting
capacitor plate being divided into a plurality of electrically separated segments;
8 a dielectric element disposed within the housing between the signal-detecting and
signal-transmitting capacitor plates;
10 a joystick lever supported for pivotal movement having a proximal end for user
engagement and a distal end which extends through the top surface of the housing and at
12 least one of the signal-detecting and signal-transmitting capacitor plates, enabling the
level to move the dielectric element in a plane substantially parallel to the stationary
14 plates as a function of user position;
circuitry in electrical communication with the stationary plates, the circuitry being
16 operative to (a) measure the capacitance between each segment of the signal-transmitting
plate and the signal-detecting plate, and (b) determine user position as a function of the
18 measured capacitance; and
an output for communicating the user position to the utilization device.

12. The joystick according to claim 11, wherein the utilization device is a
2 computer.

13. The joystick according to claim 11, wherein movement of the lever causes
2 the dielectric element to translate within the plane without rotation.

SUBA 7
2 14. The joystick according to claim 11, wherein movement of the lever causes the dielectric element to rotate within the plane without translation.

15. The joystick according to claim 11, wherein the segments of the signal-
2 transmitting plate are arcuate.

SUBA 7
2 16. The joystick according to claim 11, including 3 or 4 arcuate segments.

17. The joystick according to claim 11, wherein the dielectric element is a
2 circular disc.

ADD A 8